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ABSTRACT

Twenty male and 20 female first graders were trained in a paired-associates (PA) learning task to test the hypothesis that instructions to generate interactive mental images of word referents and interactive imagery training administered prior to PA learning facilitate cued recall. Subjects were randomly assigned to one of the following five conditions: (1) separative imagery instructions with prior picture training; (2) interactive imagery instructions with picture training; (3) separative imagery instructions with no prior training; (4) interactive imagery instructions with no prior training; and (5) a control rote repetition group. Results of a 2 (pretraining condition) x 2 (imagery instructions) analysis of variance on number of trials to criterion indicated that instructing first graders to generate interacting images and providing them with interactive pictures prior to PA training facilitated cued recall. It was concluded that imagery instructions facilitate PA recall in first graders only when such instructions are made highly explicit. (Author/RH)

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Effects of Pictorial Instruction on Paired-Associate Recall in First Graders

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Abstract

Twenty male and 20 female first-graders were trained in a paired-associates (PA) learning task to test the hypothesis that instructions to generate interactive mental images of word referents and interactive imagery training administered prior to PA learning facilitate cued recall. Subjects were randomly assigned to one of the following five conditions: (1) separative imagery instructions with prior picture training; (2) interactive imagery instructions with picture training; (3) separative imagery instructions with no prior training; (4) interactive imagery instructions with no prior training; and, (5) a control rote repetition group. Results of a 2 (pretraining condition) x 2 (imagery instructions) analysis of variance on number of trials to criterion indicated that instructing first graders to generate interacting images and providing them with interactive pictures prior to PA training facilitated cued recall relative to subjects instructed to generate separate images, those who were not provided with pictures prior to training and subjects instructed to learn word pairs in a rote manner. It was concluded that imagery instructions facilitate PA recall in first graders only when such instructions are made highly explicit.

Effects of Pictorial Instruction on Paired-Associate Recall in First Graders

Paired-associate (PA) learning is facilitated when adults (Bower, 1970; Bower & Winzenz, 1970) and preadolescents (Cramer, 1981) are instructed to generate interacting rather than separate images. However, instructions to integrate images fail to benefit PA learning for most children below the second grade unless pictures or stimulus objects accompany the imagery instructions (Danner & Taylor, 1973; Milgram, 1967; Reese, 1967; Rohwer, 1967; Yuille & Catchpole, 1974). However, Cramer (1981) found that one-third of her first grade children were able to follow the instructions to integrate images and were superior in recall to those who followed the instructions to generate separate images. Cramer (1981) also reported that all the fifth grade children who were instructed to integrate images reported doing so, and were superior in PA recall to those who were instructed to separate their images. These findings suggest that the first graders may be in a transition period in which imagery instructions are not readily understood and/or adhered to. The hypothesis tested in the present study was that first graders are quite capable of employing imagery strategies but the instructions to image are not typically understood by these children and are therefore ineffective in the facilitation of learning.

The present study, therefore, assessed the assumption that first graders' PA learning would be facilitated if pictures illustrating

the concept of interacting images were employed prior to PA training.

Method

Subjects & Procedure

Twenty male and 20 female first grade students with IQ scores ranging from 90 to 110 served as subjects.

Subjects were tested individually on a PA learning task. Two sets of eight noun pairs high in concreteness, imagery and meaningfulness (Paivio, Yuille, & Madigan, 1968) served as stimuli. Half the subjects in each group were presented with List 1 and the remaining half received List 2. A practice session consisting of eight PA items was used prior to training. The children who were presented with List 1 (List 2) during practice were subsequently trained on List 2 (List 1) for PA training and testing. The word pairs were presented auditorially on a tape recorder at 5-sec intervals. The children were instructed to use the strategy taught them during these intervals, and were periodically given a reminder of the pretraining instructions. A single study trial was followed by cued recall trials. The subjects were given 5 sec to respond to each stimulus. Stimulus-response and stimulus presentation orders were randomized for each set of study and test trials. Criterion was set at 8 out of 8 correct responses or 15 trials.

Design

The experimental design consisted of a 2 x 2 factorial with the presence or absence of pretraining pictures and separative or

integrative instructions with eight children randomly assigned to each group. The subjects in the separative imagery group were instructed to form separate mental pictures ("in the head pictures") of the word referents. The children in the integrated image condition were instructed to form a mental picture of the word referents interacting in some way.

Pretraining with pictures was accomplished by presenting the children with three colored pictures depicting two objects separated (separative condition) or two objects interacting (integrative condition). Subjects trained in the no picture groups were instructed to form either separate or interacting images, but were not provided with pictures during pretraining. An additional group of eight children, the control group, were administered standard PA instructions, i.e., "Repeat the words over and over again until you hear the next two words."

Results

A 2 (gender) x 2 (pretraining condition) x 2 (imagery instructions) analysis of variance was performed on the trials to cued recall criterion scores on the second set of eight PA items. Neither the main effects of gender, pretraining nor imagery were statistically significant, $\underline{F}$s(1, 24) = .21, 1.91, and 1.61, respectively, $\underline{p}$s > .10. With the exception of the pretraining x imagery interactions, $\underline{F}(1, 24) = 10.41$, $\underline{p} < .005$, none of the interactions were statistically significant, $\underline{p}$s > .10. Table 1 presents the mean trials to criterion

for the groups represented in the pretraining x imagery interaction and the rote control group.

Insert Table 1 about here

The means in Table 1 indicate, and were verified via a Duncan Multiple Range Test, that subjects pretrained with pictures and instructed to generate integrated images reached criterion in fewer trials than the remaining three experimental groups, $ps < .05$. Groups picture-separate, no picture-separate and no picture-integrate did not differ in their trials to criterion, $ps > .10$. Furthermore, subsequent statistical comparisons showed that the rote control subjects required more trials to reach criterion than the picture-integrate group, $p < .05$, but the former did not differ from the remaining three experimental groups, $p > .10$. The List 1 versus List 2 trials to criterion mean scores were 8.5 and 8.0, respectively, $p > .10$.

Discussion

Several investigators have shown that first grade children's cued recall is facilitated when and only when interacting pictures or stimulus objects are provided during PA training (Danner & Taylor, 1973; Milgram, 1967; Reese, 1967; Rohwer, 1967; Yuille & Catchpole, 1974). The results of the present study demonstrated that instructing first graders to generate interacting images and providing them with interacting pictures prior to PA training facilitates cued recall relative to subjects instructed to generate

separate images, those who were not provided with pictures prior to training and subjects instructed to learn word pairs in a rote manner.

These findings suggest that first grade children are quite capable of generating interacting images, without the presence of pictures or stimuli during training. The failure of most first graders to employ effective imaginal strategies (Eoff & Rohwer, 1972; Wolff & Levin, 1972) may have been due to the children's inability to comprehend the precise nature of the instructions to image.

An inference derived from previous research suggests that first grade children are in transition in the spontaneous use of imaginal strategies (see also Yuille & Catchpole, 1973). For example, instructing first graders to generate interacting images is not as an effective procedure in facilitating PA learning as having them generate sentences from word pairs; however, these strategies are equally effective for fourth graders (Kemler & Juscyzk, 1975). Furthermore, instructions to image fails to facilitate PA learning in first grade students (Eoff & Rohwer, 1972; Wolff & Levin, 1972) unless instructions are accompanied by pictures <u>during</u> training and <u>testing</u> (Milgram, 1967; Reese, 1967; Rohwer, 1967). However, the facilitation of PA learning via imagery instructions does not require pictures during testing for students beyond the second grade (Bower, 1970; Cramer, 1981; Kemler & Jusczyk, 1975). Based on the present results we suggest that in the absence of pictures during training and testing paired-associate learning in first graders is facilitated when, and only when, the instructions are made highly explicit, e.g., via interacting pictures.

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Table 1

Mean Trials to Paired-Associate Learning Criterion as a Function of Imagery Instructions and Pretraining*

		Imagery Instructions	
		Separative	Integrative
Pretraining	Without Pictures	5.6	7.7
	With Pictures	7.6	2.7**

* Rote training group mean = 6.7

** Statistically significant from all other groups, $p < .01$.